

NOVASTACK® 35-HDP 12

Part No. Plug:21150-0**E-01 Receptacle:21151-0**E-01

Product Specification

Qualification Test Report No. TR-26015

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Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Scope

This product specification defines the test conditions and the performances of the NOVASTACK 35-HDP 12 Connector .

2. Product Name and Parts No.

2.1 Product Name

NOVASTACK 35-HDP 12

2.2 Parts No.

Plug: 21150-0**E-01

Receptacle: 21151-0**E-01

3. Rating

3.1 Operating Conditions

Amperage: Signal contact ... 0.3A AC/DC (per contact)

12.0A AC/DC (total)

Power contact ... 4.5A AC/DC (per contact)

18.0A AC/DC (total)

Voltage: 60V AC (r.m.s) (per contact)

Operating temperature: 233 to 358K(-40°C to +85°C)

(Containing temperature rise by current)

Operating humidity: 85% max.

3.2 Storage Conditions

Storage temperature: 248 to 333K(-25°C to 60°C)

Storage humidity: 85% max. (Non-condensing)

4. Test and Performance

Test Condition

This initial test is equal to it's at shipping condition and unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202G.

Temperature: 288K to 308K(15°C to 35°C)

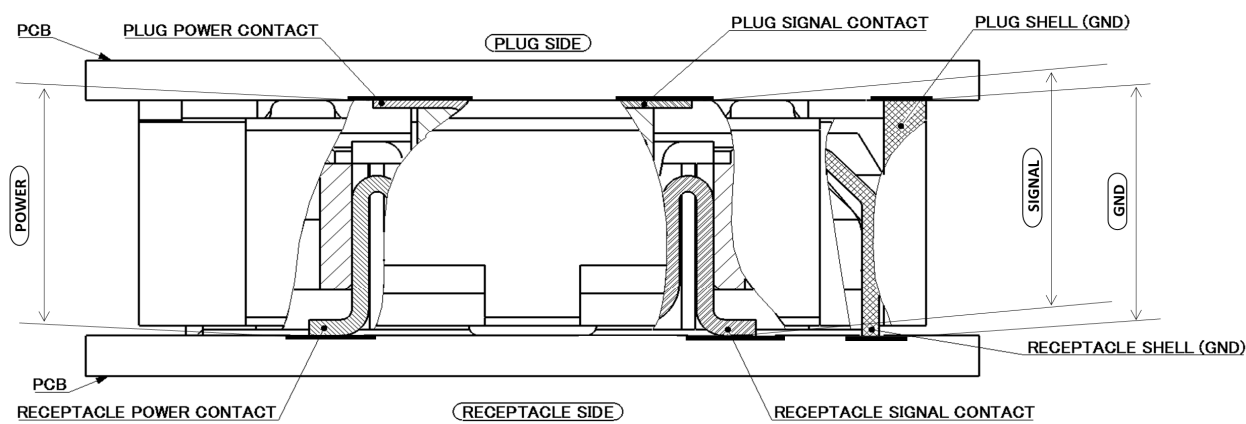
Pressure: 866hPa to 1066hPa(650mmHg to 800mmHg)

Relative humidity: 45 to 75% R.H.

4.1. Electrical Performance**1. Contact resistance**

Reference standard: MIL-STD-202G, Method 307

Test conditions: Solder the receptacle connector to the test board and mate the plug connector together, then measure the contact resistance as shown in Fig.1 by the four terminal methods. Apply the low level condition of 20mV MAX. DC for the open circuit voltage and 100mA DC for the closed circuit current.



$$\text{Contact Resistance} = R_{AB}$$

Fig.1

Pass criteria:

- Signal contact
 - Initial : 40mΩ MAX.
 - After testing : ΔR 40mΩ MAX.
- Power contact
 - Initial : 10mΩ MAX.
 - After testing : ΔR 10mΩ MAX.
- Shell
 - Initial : 20mΩ MAX.
 - After testing : ΔR 20mΩ MAX.

2. Insulation resistance

Reference standard: MIL-STD-202G, Method 302

Test conditions: Mate the plug and receptacle connector together, and then apply DC 250V between the neighboring contacts and contact to the shell.

Pass criteria: Initial: 1000 MΩ MIN. After testing: 500 MΩ MIN.

3. Dielectric withstanding voltage

Reference standard: MIL-STD-202G, Method 301

Test conditions: Mate the receptacle and plug connector together, then apply AC 250V(rms) between the neighboring contacts and contact to the shell for a minute.

Pass criteria: No abnormalities such as creeping discharge, flashover, insulator breakdown occur.

4. Temperature rising

Reference standard: -

Test conditions: Mate the plug and receptacle connector together and then apply rating current per contact.

Pass criteria: Over ambient ΔT 30 °C MAX.

4.2. Mechanical Performance

1. Mating force and Un-mating force	
Reference standard:	-
Test conditions:	Solder the plug and receptacle connector to the test board, then place the board and plug on push-on/pull-off machine, measure of initial and mating/unmating 30 cycles at a speed $25\pm 3\text{mm/min}$. along the mating axis.
Pass criteria:	Mating Signal Contact22P + Power Contact 4P : 32.0N MAX. Signal Contact56P + Power Contact 4P : 60.0N MAX. Signal Contact62P + Power Contact 4P : 70.0N MAX. Un-mating Signal Contact22P + Power Contact 4P : 3.2N MIN. Signal Contact56P + Power Contact 4P : 6.0N MIN. Signal Contact62P + Power Contact 4P : 7.0N MIN.

2. Durability	
Reference standard:	-
Test conditions:	Solder the plug and receptacle connector to the test board, then place the board and plug on the push-on/pull-off machine, and repeat mating and unmating 30cycles at a speed $25\pm 3\text{mm/min}$. along the mating axis.
Pass criteria:	Contact resistance: Shall meet4.1.1

3. Vibration	
Reference standard:	MIL-STD-202G, Method 201A
Test conditions:	Solder the plug and receptacle connector to the test board, then mate plug connector, and place them on the vibrator. Then apply the following vibration. During the testing, run 100mA DC to check electrical discontinuity. Frequency: 10Hz→55Hz→10Hz/approx. 1min. Directions: 3 mutually perpendicular direction. Total Amplitude: 1.52mm Sweep duration: 2 hours for each direction, a total of 6 hours.
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than $1\mu\text{s}$ shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

4. Shock			
Reference standard:	MIL-STD-202G, Method 213B, Condition A.		
Test conditions:	Solder the plug and receptacle connector to the test board, then mate plug connector, and place them on the shock machine. Then apply the following shock. <table border="1"> <tr> <td> MAX.G: 50G Duration: 11msec Wave Form: Half Sinusoidal </td><td> Directions: 6 mutually perpendicular direction Cycle: 3 cycles about each direction </td></tr> </table>	MAX.G: 50G Duration: 11msec Wave Form: Half Sinusoidal	Directions: 6 mutually perpendicular direction Cycle: 3 cycles about each direction
MAX.G: 50G Duration: 11msec Wave Form: Half Sinusoidal	Directions: 6 mutually perpendicular direction Cycle: 3 cycles about each direction		
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than $1\mu\text{s}$ shall occur. Appearance: No abnormality adversely affecting the performance shall occur.		

4.3. Environmental Performance**1. Thermal shock**

Reference standard:	MIL-STD-202G, Method 107G, Condition A.
Test conditions:	Solder the plug and receptacle connector to the test board, then mate plug and receptacle connector, and expose them to the following environment. Temperature: 218K(-55°C),30min.→358K(85°C),30min. Transition time: 5min. MAX. No. of cycles: 5 cycles
Pass criteria:	Contact resistance: Shall meet 4.1.1. Insulation resistance: Shall meet 4.1.2. Dielectric withstanding voltage: Shall meet 4.1.3. Appearance: No abnormality adversely affecting the performance shall occur.

2. High temperature life

Reference standard:	MIL-STD-202G, Method 108A, Condition B.
Test conditions:	Solder the plug and receptacle connector to the test board, then mate plug and receptacle connector, and expose them to the following environment. Temperature: 358±2K (85±2°C) Duration: 250 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Contact retention force: Shall meet 4.2.3. Appearance: No abnormality adversely affecting the performance shall occur.

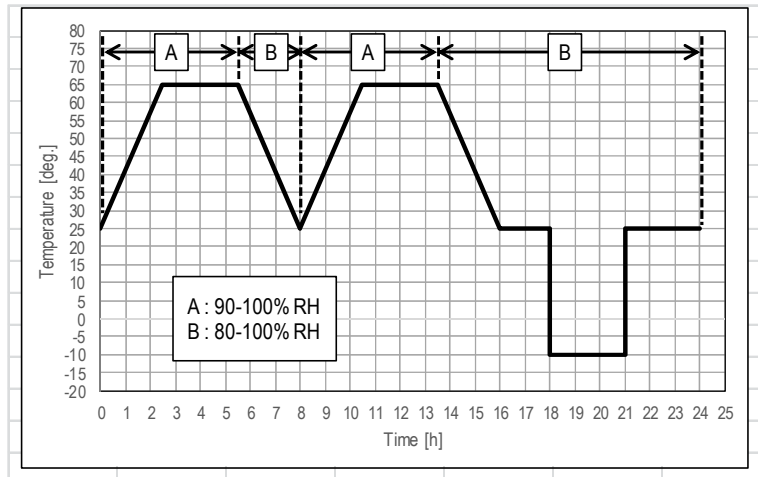
3. Humidity (Steady state)

Reference standard:	MIL-STD-202G, Method 103B, Condition A.
Test conditions:	Solder the plug and receptacle connector to the test board, then mate plug and receptacle connector, and expose them to the following environment. Temperature: 313±2K (40±2°C) Humidity: 90 to 95%RH Duration: 240 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Insulation resistance: Shall meet 4.1.2. Dielectric withstanding voltage: Shall meet 4.1.3. Appearance: No abnormality adversely affecting the performance shall occur.

4. Humidity (Cycling)

Reference standard: MIL-STD-202G, Method 106G.

Test conditions: Solder the plug and receptacle connector to the test board, then mate plug and receptacle connector, and expose them to the following environment.
 Temperature: 298[263] to 338K (25[-10] to 65°C)
 Humidity: 90 to 98%RH
 Duration: 10cycles (240hours)



Pass criteria: Contact resistance: Shall meet 4.1.1.
 Insulation resistance: Shall meet 4.1.2.
 Dielectric withstanding voltage: Shall meet 4.1.3.
 Appearance: No abnormality adversely affecting the performance shall occur.

5. Saltwater spray

Reference standard: MIL-STD-202G, Method 101E, Condition B.

Test conditions: Solder the plug and receptacle connector to the test board, then mate plug and receptacle connector, and expose them to the following environment.
 Temperature: 308±2K (35±2°C)
 Saltwater density: 5±1% [by weight]
 Duration: 48 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Appearance: No abnormality adversely affecting the performance shall occur.

6. H₂S gas

Reference standard: -

Test conditions: Solder the plug and receptacle connector to the test board, then mate plug and receptacle connector, and expose them to the following environment.
 Temperature: 313±2K (40±2°C)
 Relative humidity: 80±5%RH
 Gas: H₂S 3±1ppm
 Duration: 48 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Appearance: No abnormality adversely affecting the performance shall occur.

4.4. Others

1. Solderability

Reference standard: MIL-STD-202G, Method 208H

Test conditions: Dip the solder line of the contact in the solder bath at $518\pm 5\text{K}$ ($245\pm 5^\circ\text{C}$) for 5 ± 0.5 seconds after immersing the line in the flux of RMA or R type for 5 to 10 seconds.

Pass criteria: More than 95% of the dipped surface shall be evenly wet.

2. Soldering heat resistance

Reference standard: -

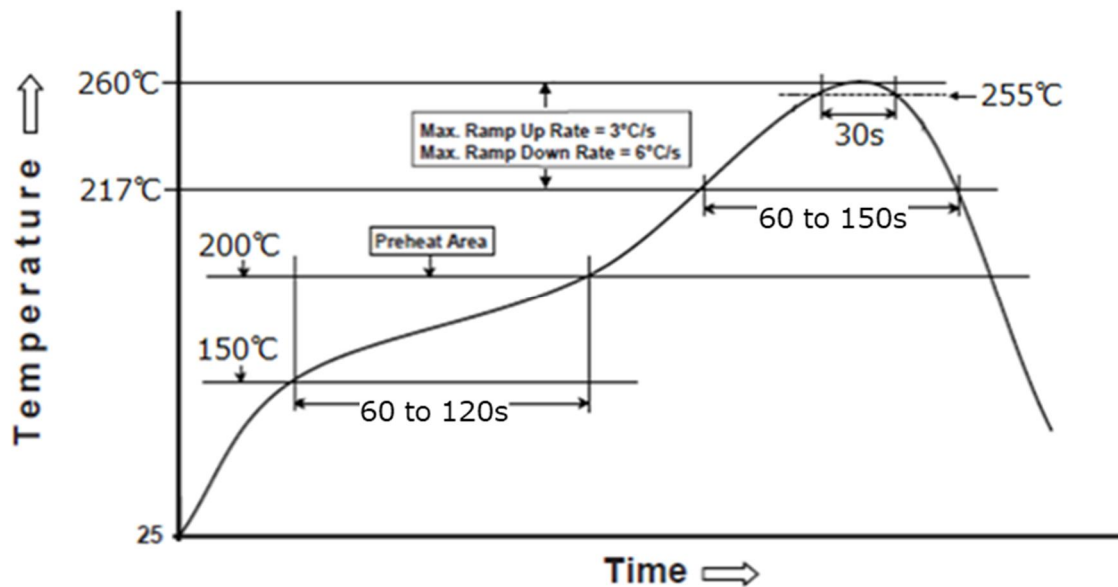
Test conditions: Reflow temperature as shown in Fig.2. The number of times of Reflow is within 2.
Nitrogen reflow cannot correspond.

Fig.2

Pass criteria: No abnormality adversely affecting the performance shall occur.

3. Solder iron

Reference standard: -

Test conditions: Operating temperature : 613 to 633K ($350^\circ\text{C}\pm 10$)
Application time of soldering iron : 5 ± 1 sec.
The number of times of application : 3time.

Pass criteria: No abnormality adversely affecting the performance shall occur.

4.5 Test Sequence and Specimen Quantity

Table.1 Test Sequence and Sample Quantity

No.		Test Item	Testing Groups											
			A	B	C	D	E	F	G	H	J	K	L	M
4.1 Electrical Performance	1	Contact resistance	2,6	1,3,5	1,5	1,3	1,5	1,5,7	1,3	1,3				
	2	Insulation resistance			2,6		2,6	2,8						
	3	Dielectric withstanding voltage			3,7		3,7	3,9						
	4	Temperature rising											1	
4.2 Mechanical Performance	1	Mating force	1,5											
		Unmating force	3,7											
	2	Durability	4					4 (10cyc)						
	3	Vibration		2										
	4	Shock		4										
4.3 Environmental Performance	1	Thermal shock			4									
	2	High temperature life				2								
	3	Humidity (Steady State)					4							
	4	Humidity (Cycling)						6						
	5	Saltwater spray							2					
	6	H ₂ S gas								2				
4.4 Others	1	Solder ability									1			
	2	Soldering heat resistance										1		
	3	Solder iron												1
Specimen quantity			5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	10 pcs.	10 pcs.	5 pcs.	10 pcs.

※Numbers indicate sequence in which tests are performed.

5. Recommended Metal Mask

Refer to DWG NO.21150 (Plug), 21151 (Receptacle)